The
SKIMMER

News of the Delaware National Estuarine Research Reserve

Volume XII, No. 3
Summer 2007

The Delaware National Estuarine Research Reserve (DNERR) is one of 27 designated reserves across the country.
The program is a federal-state partnership whose goal is to establish, protect and manage natural estuarine habitats for research and education.
Delaware's Reserve consists of two components, the St. Jones River and Blackbird Creek.
These sites include both brackish and fresh water estuaries and represent the diverse estuarine ecosystems found throughout the Mid-Atlantic.

INSIDE

2007 DELAWARE ENVIROTHON RESULTS: CONGRATULATIONS!

Congratulations to all the participants of the 2007 Delaware Envirothon! This year's event was held on May 3, 2007, at the James Farm Ecological Preserve near Ocean View, Delaware. The Inland Bays, along with bright sunshine and warm weather, provided the perfect setting for the day long event. Fourteen teams from Delaware schools participated in the competition. Wilmington Charter School "Team A" took first place. Members from the winning team included Michael Napolitano, Lauren Bleakney, Neil Nayak, Matthew Fischel and Rebecca Roelofs. Each member received a $3,000.00 annual scholarship from Wesley College and a $500.00 scholarship from the Delaware Envirothon. Kent County 4-H placed second in the State event and received the $300.00 Ernest J.Zimmerman Award. Wilmington Charter School "Team B" received the $150.00 Dean Belt Award. First place county winners inclued Wilmington Charter School "Team A," (New Castle County), Kent County 4-H (Kent County), and Sussex Tech FFA "Team A" (Sussex County).

The Envirothon is an environmental competition for students in grades 9-12. The competition consists of questions in Aquatic Ecology, Forestry, Soils/Land Use, Wildlife, and Alternative/Renewable energy. In addition to these five disciplines, each team is required to give an oral presentation. Teams prepare for the event during the school year by studying and attending workshops. The Delaware Envirothon is an established academic science competition in which the Reserve staff has been involved for over nine years by serving on the planning committee and assisting with implementation of the competition.

Kate Marvel

Second Wave Bouy Deployed

The DNERR along with the Delaware Coastal Management Program and Shoreline and Waterway Management Section deployed a second "real-time" wave buoy in Delaware Bay on May 31, 2007. This equipment is providing data needed to help guide and improve the management of Delaware's coastline. The first buoy was deployed in Lower Delaware Bay on January 11, 2007, just south of Slaughter Beach.

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Vegetation Research Along the St. Jones River

As part of my Master's of Science degree in Natural Resources at Delaware State University, I have been conducting research as an Environmental Science Intern at the Delaware National Estuarine Research Reserve. In order to fulfill the requirements of this degree, I am conducting research on the effects of sea level rise on wetland vegetation along the St. Jones River. Changes in forested, scrub/shrub, and grassy areas were quantified using Global Information System (GIS) analysis of aerial photographs of the river and surrounding vegetation from 1937, 1954, 1961, 1968, 1992, 1997, 2002, and 2006. The data collected will be statistically analyzed to examine the relationships among the vegetation changes, sea level rise, and development impacts. The long term goal of this study is to provide information from which managers can make knowledgeable decisions regarding use of the resource.

The first hurdle in this research was gathering data on sea level rise. There are several US Geological Survey (USGS) tide stations within the Delaware Bay that have recorded historical sea level values. However, it is risky to assume that the depth of water in the St. Jones River is the same as that at a tide station many miles away. Fortunately, the Reserve staff has been collecting depth data as part of the National Estuarine Research Reserve (NERR) System-Wide Monitoring Program (SWMP) that allows for comparison to the longer term data sets at these tide stations. The Reserve data set includes depth data recorded at thirty minute intervals from three stations along the river with the oldest station, Scotton Landing, recording data for nearly twelve years.

Although the SWMP data proved valuable, it had to be statistically analyzed for this study. River depth is influenced by two factors, water from upstream sources and water from the sea. Before any claims could be made about sea level rise, the source of depth increases had to be determined. Statistician Dr. Dragoljub Pokrajac from Delaware State University was brought in to "separate" the upstream water from the tidal water. Dr. Pokrajac and his graduate student, Natasa Landing near Magnolia, Delaware, Dr. Pokrajac and Ms. Reljin designed a filter that separates the tidal depth data from the non tidal depth data. After running the filters, it appears that the depth in the St. Jones River does indeed correspond to changes recorded at the USGS tide station in Lewes, Delaware. Therefore, this longer term data set was used in the vegetation analysis. The results from this portion of the study have been accepted by TELSIKS, a statistical conference and publication in Serbia.

The first step in analyzing vegetation was to determine if and where vegetative changes were occurring along the St. Jones River. The vegetation types considered in this study were grasses, emergent scrub/shrub, and forested which occur in bands or zones and shift inland with rising sea levels in a process called transgression. In order to accomplish the goal of quantifying vegetation changes, virtual transects were drawn on the historical photographs using GIS. From the Silver Lake Dam to the mouth of the river, transects were drawn at 2 Km intervals. The transects were placed at perpendicular angles from the edge of the river to the nearest vegetative restraint (development or agriculture) using 1937 as the base year for the width. The downstream transects showed no significant change since 1937, but the upstream transects did demonstrate significant change.

Once it was determined that vegetation along the upstream portion of the river was experiencing change, more detailed information was necessary to further understand the impacts of these changes. In order to obtain this information 1,000 X 1,000 m squares were digitized around each transect. Slope tests were conducted to detect statistically significant changes in the surface area of various land uses. At all four upstream

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CALENDAR OF PROGRAMS

JULY

19-28 *Come see us at the State Fair*
(DNREC Building)

AUGUST

15 *Pre-School Naturalist: "Jenny the Jellyfish"*
10:00 - 11:00 am
St. Jones Reserve component

16 *Boat Trip on the St. Jones River*
10:00 - 11:30 am
Scotton Landing

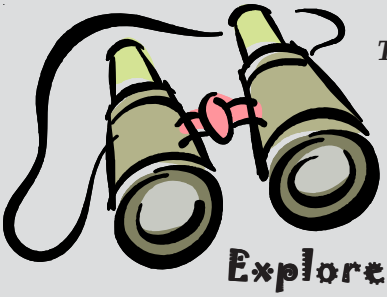
23 *Birding by Canoe along Blackbird Creek*
9:00 - 11:00 am

28 *Estuary Expedidition - 4 mile hike*
9:00 am - 12:00 pm
Blackbird Creek component

SEPTEMBER

18 *Historical Expedidition - 3 mile hike*
9:00 - 11:00 am
St. Jones Reserve component

24 *Owl Prowl at the St. Jones Reserve*
6:00 pm - 7:30 pm



To register please call (302) 739-3436.

Explore with Us!

Wave Bouy *(Continued)*

The second buoy was deployed in the mid bay region just north of Bowers Beach. The data provided by these buoys are being used by DNREC in hydrodynamic models pertaining to coastal erosion, beach replenishment and coastal restoration. The data can also be used for emergency management efforts of coastal storms and flood warnings. Since the data is "real-time" it could be useful for Coast Guard search and rescue missions and for response planning for oil spills. Assistance for both buoy deployments was provided by the Delaware Bay Launch Service.

The buoys are bright yellow and about three feet in diameter. They have a clear bubble top with solar panels for battery recharging and contain an on board data storage system. They transmit data via satellite every hour including average wave height, maximum wave height, wave direction, water temperature, and buoy location. As a public service to local mariners the data is posted on the public web sites of the National Data Buoy Center (NDBC) http://www.ndbc.noaa.gov/station_page.php?station=44054. More detailed data is posted to the Delaware Environmental Observing System (DEOS) at http://www.deos.udel.edu/index.html.

Dr. Robert Scarborough

Vegetation Research (continued)

locations, there were significant increases in the surface area of water and development while there were significant decreases in agriculture and the scrub/shrub vegetative type of the entire course of the study (1937-2006). These digitized areas indicate that both sea level rise and development are affecting the vegetation along the upper portion of the St. Jones River, possibly causing transgression or an upstream transition in vegetation.

If vegetative types are shifting upstream, the natural question is how much and why. In order to answer these questions, single center points for the vegetative categories of forested, grasses, and scrub/shrub were calculated for each available photograph. Although this analysis is not yet complete, an upstream shift of scrub/shrub areas has been detected. Once these shifts have been quantified, they will be statistically compared to the sea level rise and the amount of development in the watershed.

Stephanie Stotts

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Production of this Document Funded By:
The Delaware Department of Natural Resources and Environmental Control, DNERR, Pursuant to National Oceanic and Atmospheric Administration Award No. NA06NOS4200121

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Doc. No. 40-07-01/07/06/03

Printed on recycled paper

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